Tara L. Morgan-King, David H. Schoellhamer, U.S. Geological Survey, Placer Hall 6000 J. St. Sacramento, Ca 95819 USA, *Corresponding author: tamorgan@usgs.gov phone (916) 278-3162 fax (916) 278-3013

Cache Slough Turbidity, Sediment, and Salinity Trends in 2011 - How do they compare to 2010?

Abstract: The Cache Slough area provides year round habitat to the endangered delta smelt. Since 2008 we have measured turbidity, water flow, and suspended-sediment flux and we have quantified that turbidity is higher in this region than elsewhere in the Delta. High turbidity is maintained by a repetitive cycle of both tidal and wind-wave resuspension. Flood dominant tidal currents, low fresh water flow, a limited tidal excursion, and irrigation pumping are mechanisms that trap sediment in the area. Yolo Bypass discharges into the Cache Slough complex and during water year 2011, the first major release of flood waters flowed through the bypass since the onset of the study. In 2011, more than two and a half times the quantity of water moved seaward through the region than in 2010. Salinity values were comparable and we observed high turbidity throughout the region in both years. Due in part to flows that occurred in the Yolo Bypass, nearly five times the sediment was transported seaward in 2011 as compared to 2010, and at least four times the sediment was retained within the region in 2011. After Yolo Bypass had spilled and deposited sediment in March 2011, wind-wave resuspension on flooded Liberty Island supplied suspended sediment to Cache Slough. In summary, the backwater Cache Slough complex, which contains dead-end channels, traps sediment and is more turbid than the rest of the Delta whether or not the Yolo Bypass spills.

Statement of Relevance: Our project monitors and analyzes turbidity, salinity, and water temperature around Cache Slough, an area known to provide habitat to delta smelt. These physical water quality parameters are all identified as critical within the POD conceptual model. Understanding turbidity and sediment flux dynamics are essential for restoration and Delta management.